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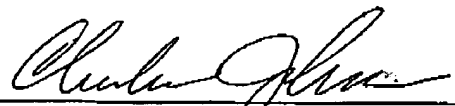

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Item: Appeal Brief 53 pages
Serial No.: 09/803,248
Docket No.:PU010033
Art Unit: 2675
Examiner: Anyaso, Uchendu O

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Before the Board of Patent Appeals and Interferences

Applicant	:	Donald Henry Willis
Serial No.	:	09/803,248
Filed	:	March 9, 2001
For	:	REDUCING SPARKLE ARTIFACTS WITH LOW BRIGHTNESS SLEW RATE LIMITING
Examiner	:	Anyaso, Uchendu O
Art Unit	:	2675

APPEAL BRIEF

May It Please The Honorable Board:

This is Appellants' Brief on Appeal from the final rejection of claims 1 – 29. Please charge the $$330.00 fee for filing this Brief to Deposit Account No. 07-0832.

Please charge any additional fee or credit overpayment to the above-indicated Deposit Account. Enclosed are three copies of the Brief.

I. REAL PARTY IN INTEREST

The real party in interest of Application Serial No. 09/803,248 is :

THOMSON Multimedia Licensing Inc.

II. RELATED APPEALS AND INTERFERENCES

Applicant filed an appeal brief for a case related in subject matter (Application Serial No. 09/803,249) to the present application. A copy of appellants brief for that case is appended hereto as Appendix II.

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III. STATUS OF THE CLAIMS

Claims 1-29 are rejected and the rejection of claims 1-29 are appealed. Claims 3, 4 and 12, 13 are objected to but were deemed allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

IV. STATUS OF AMENDMENTS

All amendments were entered and are reflected in the claims included in Appendix I.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention is directed to reducing a specific effect observed when displaying video images on liquid crystal imaging display. This effect, as explained in detail in applicant's specification on pages 1-4, can be summarized as follows. Liquid crystal imagers are known to have severe non-linearities in their display transfer functions. What this means is the following. For an ideal linear transfer function, adjacent pixels that have only a moderate difference between them in brightness level, would be driven by pixel drive voltages corresponding to their respective brightness levels. Then, the pixels would be displayed to a viewer and perceived by the viewer as having only the intended moderate brightness difference corresponding to their brightness levels. However, the non linearity of the imager transfer function results in adjacent pixels with only moderately different brightness levels being perceived by a viewer as having very different displayed brightness. This perceptual effect is especially marked at low brightness levels. A solution to this problem is to adjust the pixel drive voltages so that the perceived brightness differences from pixel to pixel will be closer to what the intended perceived brightness difference is. However, as a result of this correction, it sometimes happens that two adjacent pixels, having only moderately different brightness levels, will be driven by very different voltages when they are displayed. In other words, instead of a moderately different drive voltage for the next pixel, the actual drive voltage applied to the next pixel will be very much different, to correct for the non linear transfer function. This in spite of the fact that the actual brightness level for the second pixel is only moderately different from the first. It happens that the pixels of LCOS imagers are sensitive to magnetic field and flux changes in such a way that too great difference in drive levels from pixel to pixel produces a noticeable artifact in the displayed picture. Applicant denotes this artifact "sparkle".

1. Claim 1 is directed to a method for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager. The method comprises the steps of: decomposing [as in decomposer 12 of Figs. 1, 2] a video signal for a picture [INPUT X in Fig. 1] into a

higher brightness level signal [HIGH in Figs. 1, 2 and 3] and a lower brightness level signal [LOW in Figs 1, 2 and 3]. The lower brightness level signal is slew rate limited [SLEW RATE LIMTER 22 in Fig. 1]. The higher brightness level signal is delayed [DELAY MATCH in Fig.1] to match a processing delay incurred by said slew rate limiting step. The slew rate limited lower brightness level signal and the delay matched higher brightness level signal are combined [adder 26 in Fig. 1 and 3] so as to generate a modified video signal [X'in Figs 1 and 3]. The video signal modified in this way [X' in Figs 1 and 3] is less likely to result in sparkle artifacts in the imager.

2. The method of claim 1, comprising the step of decomposing said video signal in accordance with a transition between lower and higher gain portions of a gamma table associated with said imager.

3. The method of claim 1, wherein said decomposing step includes the steps of: selecting a brightness level threshold; comparing successive input brightness levels of said luminance signal to said selected threshold; for each said input brightness level greater than said threshold in said comparing step, assigning to said higher brightness level signal a brightness level equal to a difference between said greater input brightness level and said threshold and assigning to said lower brightness level signal a brightness level equal to said threshold; and, for each said input brightness level less than said threshold in said comparing step, assigning to said higher brightness level signal a brightness level equal to zero and assigning to said lower brightness level signal a brightness level equal to said input brightness level.

4. The method of claim 3, comprising the steps of: assigning to said higher brightness level signal a brightness level equal to zero if said input brightness level is equal to said threshold; and, assigning to said lower brightness level signal a brightness level equal to said input brightness level if said input brightness level is equal to said threshold.

5. The method of claim 1, comprising the step of delaying said higher brightness level signal to compensate for a delay incurred in said slew rate limiting.

6. The method of claim 1, comprising the steps of: applying said sparkle reducing steps to a luminance signal for said picture; delaying chrominance signals for said picture; and, generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

7. The method of claim 6, comprising the steps of: applying said sparkle reducing steps to at least one of said video drive signals; and, delaying all non-sparkle-reduced video drive signals.

8. The method of claim 1, comprising the steps of: generating a plurality of video drive signals from luminance and chrominance signals; applying said sparkle reducing steps to at least one of said video drive signals; and, delaying all non-sparkle-reduced video drive signals.

9. The method of claim 8, comprising the step of applying said sparkle reducing steps to each of said video drive signals.

10. The method of claim 7 comprising the step of independently selecting slew rate limits for said slew rate limiting steps.

11. A circuit [10 in Fig. 1] for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: means for decomposing [12 in Figs. 1 and 2] a video signal for a picture [Input X in Figs. 1 and 2] into a higher brightness level signal [HIGH in Figs. 1, 2 and 3] and a lower brightness level signal [LOW in Figs 1, 2, and 3]; means for slew rate limiting [22 in Fig. 1] said lower brightness level signal; means for delaying [24 in Fig. 1] said higher brightness level signal to match a processing delay incurred by said slew rate limiting; and, means for combining [26 in Figs. 1 and 2] said slew rate limited lower brightness level signal and said delay matched higher brightness level signal to generate a modified video signal [X' in Figs 1 and 3] less likely to result in sparkle artifacts in said imager.

12. The circuit of claim 11, wherein said decomposing means includes: a register for storing a selected threshold value; a comparator for comparing successive input brightness levels of said luminance signal to said selected threshold value; an algebraic circuit for subtracting said threshold value from every one of said input brightness levels greater than said threshold; a clipping circuit for limiting to said threshold value every one of said input brightness levels greater than said threshold value a first gate for propagating a zero value brightness level for every one of said input brightness levels less than said threshold value; a second gate for propagating said input brightness level for every one of said input brightness levels less than said threshold; and, said higher brightness signal is formed by outputs from said algebraic circuit and said first gate and said lower brightness level signal is formed by outputs from said clipping circuit and said second gate.

13. The circuit of claim 12, wherein: said higher brightness level signal is formed by said output of said first gate when said input brightness level is equal to said threshold value; and, said lower brightness level signal is formed by said output of said second gate when said input brightness level is equal to said threshold value.

14. The circuit of claim 11, wherein said threshold value relates to a transition between lower and higher gain portions of a gamma table associated with said imager.

15. The circuit of claim 11, wherein said higher brightness level signal is delayed to match a delay incurred by operation of said slew rate limiting means.

16. The circuit of claim 11, wherein said video signal is a luminance signal, and further comprising: means for delaying chrominance signals for said picture; and, means for generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

17. The circuit of claim 16, comprising: means for decomposing at least one of said video drive signals into a higher brightness level video drive signal and a lower brightness level video drive signal; means for slew rate limiting said lower brightness level video drive signal; means for delaying said higher brightness level video drive signal to match a processing delay incurred by said slew rate limiting; and, means for combining said slew rate limited lower brightness level video drive signal and said delay matched higher brightness level

video drive signal to generate a modified video drive signal resulting in a further reduction of declination in said imager.

18. The circuit of claim 17, wherein said brightness level thresholds for said luminance signal decomposing means and said video drive signal decomposing means are independently selectable.

19. The circuit of claim 17, wherein slew rate limits for said slew rate limiting means are independently selectable.

20. The circuit of claim 17, comprising: respective means for decomposing, slew rate limiting, delaying and combining each one of said video drive signals; and, each of said luminance signal decomposing means and said video drive signal dividing means having independently selectable brightness level thresholds and each of said slew rate limiting means having independently selectable slew rate limits.

21. A circuit [10 in Fig. 1] for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: a decomposer [12 in Figs. 1 and 2] for dividing a video signal for a picture [Input X in Figs. 1 and 2] into a higher brightness level signal [HIGH in Figs. 1, 2 and 3] and a lower brightness level signal[LOW in Figs 1, 2, and 3]; a slew rate limiter [22 in Fig. 1] for processing said lower brightness level signal, said slew rate limited lower brightness level signal being delayed; a delay circuit (24 in Figs. 1 and 3] for said higher brightness level signal matched to said processing delay in said slew rate limiter; and, an algebraic circuit [26 in Figs 1 and 3] for combining said slew rate limited lower brightness level signal and said delay matched higher brightness level signal, and generating a modified video signal [X'in Figs 1 and 3] less likely to result in sparkle artifacts in said LCOS imager.

22. The circuit of claim 21, wherein said decomposer circuit has a selectable threshold value.

23. The circuit of claim 22, wherein said threshold value is related to a transition between lower and higher gain portions of a gamma table associated with said imager.

24. The circuit of claim 22, wherein said higher brightness level signal is delayed to match a delay incurred by said slew rate limiter.

25. The circuit of claim 21, wherein said video signal is a luminance signal, and further comprising: delay circuits for delay matching chrominance signals for said picture with said modified luminance signal; and, a color space converter for generating a plurality of video drive signals from said modified luminance signal and said delay matched chrominance signals.

26. The circuit of claim 25, further comprising: a further decomposer for decomposing at least one of said video drive signals into a higher brightness level video drive signal and a lower brightness level video drive signal; a further slew rate limiter for said lower brightness level video drive signal; a further delay circuit for delaying said higher brightness level video drive signal to match a processing delay incurred by said slew rate limiter; and, a further algebraic circuit for combining said slew rate limited lower brightness level video drive

signal and said delay matched higher brightness level video drive signal to generate a modified video drive signal, resulting in a further reduction of declination in said imager.

27. The circuit of claim 26, wherein said decomposer and said further decomposer have independently selectable brightness level thresholds.

28. The circuit of claim 26, wherein said slew rate limiter and said further slew rate limiter have independently selectable slew rate limits.

29. The circuit of claim 26, comprising: respective decomposers, slew rate limiters, delay circuits and algebraic circuits for processing each one of said video drive signals; and, each of said decomposers having independently selectable brightness level thresholds.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Regarding claims 1-29 applicant appeals the action of the office dated Dec. 12, 2003 rejecting claims 1-29 as unpatentable over Gadeyne et al (US Patent 6,359,663) in view of Ho et al (US 6,208,327), Iwaki (JP patent No. 088770) and further in view of Timm (US 6,246,389) and in further view of Sani et al (US 6,219,101). Regarding independent claims 1, 11 and 21 applicant appeals the rejection stated in the office action dated Dec. 12, 2003, wherein independent claims 1, 11 and 21 were rejected as unpatentable over Gadeyne et al (US Patent 6,359,663) in view of Ho et al (US 6,208,327), Iwaki (JP patent No. 088770) and further in view of Timm (US 6,246,389) and in further view of Sani et al (US 6,219,101).
2. Regarding the claims 1-29 applicant appeals the rejection of independent claims 1-29 stated in the office action dated April 2004 rejecting independent the claims as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230). Regarding the claims 1, 11 and 21 applicant appeals the rejection of independent claims 1, 11 and 21 stated in the office action dated April 2004 rejecting independent claims 1, 11 and 21 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230).

VII. ARGUMENT

1. Regarding claims 1-29 applicant appeals the rejection of claims 1-29 made in the office action dated Dec. 12, 2003, wherein independent claims 1, 11 and 21 were rejected as unpatentable over Gadeyne et al (US Patent 6,359,663) in view of Ho et al (US 6,208,327), Iwaki (JP patent No. 088770) and further in view of Timm (US 6,246,389) and in further view of Sani et al (US 6,219,101).
    a. As a first step in supporting the above rejection, claims 1, 11 and 21 were rejected over the combination of Gadeyne and Ho. The examiner relies on Gadeyne as teaching, "a method of reducing artifacts which are caused by the difference in luminance response times". The examiner relies on Ho as teaching "a method and an apparatus for eliminating image sparkle artifacts by correcting sub-pixel defects and column disclinations that are present in any display technology that has matrix addressed pixels." The examiner states the motivation to combine Gadeyne and Ho would be "to improve image quality." The examiner cites this motivation is provided by Gadeyne, col 2 lines 35 -38. The examiner concludes Gadeyne and Ho together teach "a method of reducing artifacts."
        i. Gadeyne teaches "a method of reducing artifacts which are caused by the difference in luminance response times". However, the examiner has neglected to explain how such a teaching could be applied to meet the requirements of any of applicant's claims.
        ii. The problem to which applicant's invention is directed is not caused by "difference in luminance response times" Applicant's claims are directed to artifacts caused by " " . One of ordinary skill in the art would not be led to apply Gadeyne's teaching to solve applicant's problem.
        iii. Ho does NOT teach "a method and an apparatus for eliminating image **sparkle** artifacts by correcting sub-pixel defects and column disclinations that are present in any display technology that has matrix addressed pixels" . Ho describes, a method and an apparatus for eliminating image artifacts by correcting sub-pixel defects and column disclinations that are present in any display technology that has matrix

addressed pixels" Ho does not describe these artifacts as sparkle, nor do such artifacts meet applicant's clear and specific definition of sparkle artifacts. The examiner has neglected to explain how the teachings of Ho could be applied to meet any limitations of applicants claims.

iv. The examiner concludes Gadeyne and Ho together teach "a method of reducing artifacts." However, the examiner has neglected to indicate how such a method based upon the teaching of Gadeyne and Ho could be applied to meet any limitations of applicant's claims. Nor has the examiner indicated how "a method of reducing artifacts" based upon the teachings of Gadeyne and Ho address any part of applicant's particular problem of sparkle artifacts.

v. The examiner states the motivation to combine Gadeyne and Ho would be "to improve image quality." However, the examiner has neglected to indicate how the references could be combined and applied in such a way as to improve image quality. Applicant asserts there is no way to combine the teachings of Gadeyne and Ho to improve image quality.

vi. The cited motivation to combine is not a motivation , but a disincentive to combine. The portion of Gadeyne cited as providing the motivation to combine Gadeyne with Ho "to improve image quality" is found in the summary of Gadeyne's own invention. Gadeyne's invention is directed to improving image quality in areas surrounding posts [mechanical structures used for spacing] and clusters of defective pixels. " The tonal quality can be improved by adjustment of the driving voltage of the neighborhood pixels surrounding post or pixel defects. (see Gadeyne). In summarizing his invention Gadeyne states, "The driving voltages of each pixel in a neighborhood region of a post or cluster of pixels that deviate from nominal, are modified to eliminate image artifacts and improve image quality." Thus one must conclude that Gadeyne's statement is an assertion to the reader that Gadeyne's invention provides the called for improvement in image quality. Gadeyne lacks any suggestion that still further improvements in image quality should be sought, or that his given solution lacked

anything at all. Further lacking is any suggestion as to what further improvements might exist and where they might be found. Further, Gadeyne lacks any suggestion that image quality could be further improved by relying on any teachings of Ho. Therefore, the examiner has failed to make a prima facie case of obviousness because he has not met his burden to provide a reason why one of ordinary skill in the art would be motivated to combine the references to arrive at applicant's claimed invention.

b. As a second step in supporting the above rejection, claims 1, 11 and 21 were rejected over the combination of Gadeyne and Ho, in view of Iwaki. The examiner concludes Gadeyne and Ho together teach "a method of reducing artifacts." The examiner recognizes Gadeyne and Ho do not teach the step of dividing a video signal for a picture into a higher brightness level signal and a lower brightness level signal. The examiner relies on Iwaki as teaches dividing a video signal according to brightness level. The examiner states the motivation to combine Gadeyne and Ho with Iwaki is provided by the abstract of Iwaki and would have been "to obtain image data whose resolution is enhanced with fidelity to a substantial image without causing a pattern such as a stripe pattern." The examiner concludes the combination of Gadeyne, Ho and Iwaki teach "a method of reducing artifacts that utilizes a method of dividing a signal according to the brightness level"

   i. The combination of Gadeyne and Ho together do not teach "a method of reducing artifacts" such that the taught method could meet any limitations in applicant's claims. See applicant's comments above regarding the combination of Gadeyne and Ho.

   ii. The examiner asserts Iwaki teaches "a method of reducing artifacts that utilizes a method of dividing a signal according to the brightness level". However, a close reading of Iwaki reveals that there is lacking any teaching of dividing a signal, or dividing any other physical phenomena. Further, there is lacking any reference to dividing a signal according to brightness level. In using the term "dividing" Iwaki refers only to dividing a "read range" into three equal divisions (in a very

rough translation from the Japanese). In this context "dividing" refers to dividing a range of theoretically possible values into equal sub ranges for the purpose of "classifying" and making "judgments" about light reflected from a manuscript with respect to the ranges. Therefore, a "read range" is not a signal, nor is it a video signal. Dividing a read range is not dividing a video signal.

iii. Further, the cited motivation to combine Iwaki with combination of Gadeyne and Ho is "to obtain image data whose resolution is enhanced with fidelity to a substantial image without causing a pattern such as a stripe pattern." However, the examiner fails to show how that motivation, if it existed, would lead one of ordinary skill in the art to combine Iwaki with Gadeyne and Ho to arrive applicants claimed invention. On the contrary, one of ordinary skill in the art would not likely be motivated to apply the teachings of Iwaki about avoiding stripe patterns in facsimile machines with the teachings of Gadeyne and Ho for any reason apparent.

iv. Further, the cited motivation to combine Iwaki with combination of Gadeyne and Ho is not a motivation but rather, a disincentive. The examiner states the motivation to combine is found in the abstract of Iwaki. Iwaki states the purpose of his invention is "to obtain image data whose resolution is enhanced with fidelity to a substantial image without causing a pattern such as a stripe pattern." One must presume that Iwaki's statement is an assertion that his invention achieves the stated purpose and that his disclosure is sufficient to enable one of ordinary skill in the art to achieve the purpose. There is no teaching in Iwaki that would suggest to one of ordinary skill in the art that the invention was lacking in its purpose, that improvements would be desirable, or that one should look elsewhere, to other references, or to Gadeyne, or to Ho, or to the combined teachings of Gadeyne and Ho for any reason.

c. As a third step in supporting the above rejection of claims 1, 11 and 21 the examiner recognizes neither Gadeyne, Ho or Iwaki teach a "method for slew rate limiting different brightness levels". The examiner cites Timm as teaching "how to parse the divide video signals based on the slew rates". The examiner states the motivation for this combination is found in Timm (col 1 lines 55-57) and the motivation would be "to achieve a system that provides intensity variation for slew rate with high speed and low cost." Thus the examiner asserts that the combination of Gadeyne, Ho, Iwaki and Timm teaches a "method of reducing artifacts that utilizes a method of dividing a signal according to the brightness level and then how to parse the divided video signals based on slew rates."

   i. Timm's disclosure does not teach slew rate limiting. The nature of Timm's application would discourage one of ordinary skill in the art from slew rate limiting. Timm's teaching is not related to applicant's invention. Timm is concerned with display of digitized waveforms in instruments such as digital oscilloscopes, heart monitors and spectrum analyzers. Timm discloses representing slew rate of the signal being measured by intensifying the displayed waveform of the signal being measured along the line where a high slew rate is represented. Timm lacks any suggestion or teaching to change the slew rate in any way. "The slew rate of a signal, about a point, is estimated based on measuring the magnitude of the vertical change of the waveform between consecutive samples. A smaller vertical waveform change means a lower slew rate about the point and intensity is set to a higher value. A larger vertical waveform change means a higher slew rate about the point and intensity is set to a lower value. A look-up table is used for intensity of a point or line segment as a function of vertical waveform change about the point. Therefore, computation is reduced to a single subtraction and a table look-up."

   ii. The teachings of Timm would discourage slew rate limiting because in the instruments to which Timm is directed (oscilloscopes, heart monitors), faithfully reproducing the waveform, including the slew rate, of the signal under investigation would be particularly important.

iii. The cited motivation to combine is not a motivation to combine but is actually a disincentive to combine. The examiner cites the specification of Timm as providing the motiviation to combine Gadeyne, Ho, Iwaki with Timm. The cited portion of Timm states, "A system is needed that provides intensity variation for slew rate with high speed, simplicity and low cost." However, in summarizing his invention, Timm describes how he has solved this need. Therefore, one of ordinary skill in the art would be discouraged from looking further. Tim's disclosure lacks any suggestion that Timms solution is inadequate, or could be improved by looking to other references. There is certainly no suggestion in Timm to combine Timms disclosure with the teachings of Gadeyne, Ho, Iwaki. Therefore, the examiner has failed to make a prima facie case of obviousness because he has not met his burden to provide a reason why one of ordinary skill in the art would be motivated to combine the references. Conclusory statements.

d. As a fourth step in supporting the above rejection, the examiner recognizes neither Gadeyne, Ho, Iwaki or Timm teach a low pass filter that filters the lower brightness level signal component of a video signal. The examiner cites Sani as teaching how to filter various luminance components of a video signal. The examiner cites Sani col 1, lines 50-58 as providing the motivation for making this combination, the motivation being "to prevent flickering in a display device"

i. The examiner fails to explain how the teachings of Sani could be combined with any other cited reference to arrive at applicant's claims.

ii. The combination of Gadeyne Ho Iwaki and Timm and Sani would not arrive at applicants claimed invention.

iii. The cited motivation to combine is not a motivation to combine but is actually a disincentive to combine. The portion of Sani cited as providing the motivation to combine the teachings of Sani with Gadeyne Ho Iwaki is found in the summary of Sani's invention, "In accordance with this invention, an RGB to composite video converter

includes a flicker filter to essentially eliminate the flicker in the luminance component of the composite video, which otherwise would appear in the television image. The flicker filter accepts input signals in the YCbCr format and eliminates flickering by averaging the pixels, with minimum memory component requirements. The flicker filter incorporates a user control to perform a three line, two line or no filtering." As this is the summary of Sani's invention, one of ordinary skill in the art, upon reading it, would not be motivated to look further in order to "to prevent flickering in a display device". Sani lacks any suggestion that his solution to the problem is deficient or could be improved, or that one should look elsewhere for other solutions. Therefore Sani cannot be said to provide motivatation for combining his own teaching with any of the other references "to prevent flickering in a display device". On the contrary, one of ordinary skill in the art would be dissuaded from looking further for such a solution, as Sani has provided it.

2. Regarding the claims 1-29, applicant appeals the rejection of claims 1-29 based on the office action dated April 2004 rejecting independent claims 1, 11 and 21 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230).
    a. As a first step in supporting the above rejection, claims 1, 11 and 21 were rejected over the combination of Okada and Mihara. The examiner relies on Okada as teaching "a means for dividing an input signal into a high brightness and low brightness part...low pass filters for independently low pass filtering rising transients and falling transients in said low brightness signal.." The examiner relies on Mihara as teaching how to slew rate limit signals in varying rates and then displaying the signals. The examiner cites Mihara col 2 lines 20-25 as providing the motivation to combine which the examiners states would have been "to provide an excellent waveform display device capable of efficiently displaying large quantity of data"
        i. The examiner errs in relying on Okada's disclosure of "means for dividing light" as teaching or suggesting applicant's features relating to decomposing video signals because the reference describes a light

dividing means, and then only in the context of an optical subsystem. Optics is a non analogous art. The dividing means of the Okada reference is described by Okada (abstract) as follows: "A beam splitter divides light reflected by the surface of the object into two parts. Each of the divided parts of the light is passed through an optical filter whose transmission wavelength range is set according to the colors of the object, to adjust the quantity of transmitted light from a high-brightness part of the object surface and the quantity of transmitted light from a low-brightness part of the object surface to a reference level."

ii. The principles of engineering and physics applicable to dividing visible light into light beams using beamsplitters, (the science of optics) are not applicable to the task of decomposing a video signal into video signal components. Okada lacks any teaching that the term "light" should be given any meaning other than its ordinarily understood meaning, that is "radiant energy that is capable of exciting the retina" (The New IEEE Standard Dictionary of Electrical and Electronics Terms, The Institute of Electrical and Electronics Engineers, Inc., 1993, page 714.) The term "video signal" as commonly understood and as described in applicants specification, for example, in paragraph 32: "The video signal is a digital signal, and the waveform is a succession of digital samples representing brightness levels." One of ordinary skill in the art would not be motivated to provide a video signal to an optical dividing means such as a beamsplitter so as to decompose the video signal into high and low brightness level video signal components prior to low pass filtering. One of ordinary skill in the art would not expect success in such a combination.

iii. Finally, It would be technically impossible and non feasible to modify such an optical sub-system so that it could decompose a video signal at all, let alone into components in a way that would meet the requirements of applicant's claims. This fact, in and of itself, is a disincentive to the artisan to do so.

iv. Mihara does not teach to slew rate limit signals. The cited column 4 lines 23 - 27 recites: "By the method as described in the above example the part *[of the waveform of the measured analog signal]*, where the slew rate of the waveform [*of the measured analog signal*] is high, is displayed darkly [*on the waveform displaying device*] and the part, where the slew rate is low, is displayed brightly *[on the waveform displaying device]*." Therefore, Mihara describes displaying a waveform differently [displaying darkly, or displaying lightly], based on slew rate of the signal to be represented by the waveform. There is no teaching in Mihara to slew rate limit a signal or a waveform.The cited abstract of Mihara describes, "A waveform displaying device, in which a measured analogue signal is converted into a digital signal by means of an analogue to digital converter and thereafter the digital signal is directly inputted in a display device (19) such as a raster scanning display, a liquid crystal display device, effecting the display while controlling the brightness of pixels **so as to reproduce to display waveform of the measured analogue signal.** In the present device the brightness of pixels is varied, **depending on slew rate** of the waveform, so that the **brightness of interpolation lines is increased**, when differences between inputted waveform data are small, and the brightness is decreased, when the differences are small." A teaching to increase the brightness of interpolation lines in portions of a waveform where the represented signal has a high slew rate is not a teaching of slew rate limiting any signal or waveform. Therefore, it can be readily appreciated by a close reading of the above cited portions of the Mihara specification that no teaching of slew rate limiting a signal, or of a slew rate limiter, is provided by Mihara.

v. The cited motivation to combine "to provide an excellent waveform display device capable of efficiently displaying large quantity of data" would not motivate one of ordinary skill in the art to combine the teachings of Mihara with the teaching of Okada because Okada is not a waveform displaying device. Neither is applicant's invention.

vi. The cited motivation to combine is actually a disincentive to combine. The examiner cites Mihara col 2 lines 20-25 as providing the motivation to combine Okada with Mihara in order "to provide an excellent waveform display device capable of efficiently displaying large quantity of data". The cited motivation is alleged to be found in the summary of Mihara's invention wherein is stated, "The present invention has been done in order to solve the problems of the conventional technique described above and the object thereof is to provide an excellent waveform displaying device capable of displaying waveform data of large quantity, without losing any information which they have." It would be reasonable for one of ordinary skill in the art, upon reading the above statement, to presume that the invention of Mihara meets its stated objects. Mihara lacks any teaching that something is missing in this regard from the solution offered by his invention. Therefore, one of ordinary skill in the art, upon reading the disclosure of Mihara, would be dissuaded from looking elsewhere in order "to provide an excellent waveform display device capable of efficiently displaying large quantity of data". So, 'Mihara totally lacks any motivation to combine Okadas teachings regarding dividing visible light to arrive at applicant's claimed invention.

b. As a second step in supporting the above rejection, claims 1, 11 and 21 were rejected as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230). The office action states the combination of Okada and Mihara teach the concept of dividing an input signal into a plurality of sighals... and Carslon teaches the method sparkle suppression. The examiner states the motivation to combine is found in the abstract of Carlson, "to achieve noise reduction without the introduction of noticeable artifacts in a display image." '

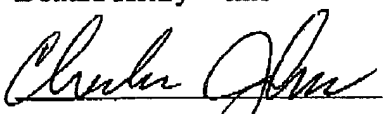
i. First, the sparkle to which Carlson refers, and defines in his specification is a different artifact from sparkle artifact defined in applicant's specification. Applicant's sparkle artifact is explained hereinabove in the description of the invention.

ii. Carlsons teaching about sparkle suppression is extremely limited. The term sparkle is mentioned only in the last paragraph of the specification. Carlson states, "However, in wide-band coring schemes, a disadvantage of this alternative technique [filtering after coring] is that it tends to produce a high spatial frequency artifact known as "sparkle" in the displayed image derived from the output of such a coring means. However, an image processing system using narrow-band coring in accordance with the principles of the present invention the filtering after coring suppresses "sparkle", making this alternative technique more practical." As applicant's invention does not rely on filtering after wideband coring the solution propsed by Carlson, to use narrowband coring before filtering, would not be applicable to applicants invention. Therefore, Carlson could not be combined with any other teaching to arrive at applicant's claimed invention.

iii. Assuming arguendo, the teaching of Carlson could be combined with the other references, the examiner has failed to provide a reason why one of ordinary skill in the art would be motivated by the statement of Carlson to make the combination of Okada Mihara and Carlson to arrive at applicants claimed invention. The cited motivation to combine is actually a disincentive to combine. Carlson, in his abstract asserts the following regarding his invention, Noise reduction is achieved, without the introduction of noticeable artifacts in the displayed image. Therefore, one of ordinary skill in the art would reasonably conclude that Carlson had solved the problem and achieved such noise reduction. This is not an incentive to combine other references with the teachings of Carlson. Rather it is an incentive to look no further, i.e., a disincentive, because Carlson provides the solution. There is no suggestion in the disclosure of Carlson that his solution is lacking, that more is needed, or that one should look elsewhere. Specifically, there is no motivation to look to combine Carlson with Okada and Mihara to arrive at applicant's claimed invention.

Respectfully submitted,

Donald Henry Willis

By: 

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APPENDIX I - APPEALED CLAIMS

1. A method for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising the steps of: decomposing a video signal for a picture into a higher brightness level signal and a lower brightness level signal; slew rate limiting said lower brightness level signal; delaying said higher brightness level signal to match a processing delay incurred by said slew rate limiting; and, combining said slew rate limited lower brightness level signal and said delay matched higher brightness level signal to generate a modified video signal less likely to result in sparkle artifacts in said imager.

2. The method of claim 1, comprising the step of decomposing said video signal in accordance with a transition between lower and higher gain portions of a gamma table associated with said imager.

3. The method of claim 1, wherein said decomposing step includes the steps of: selecting a brightness level threshold; comparing successive input brightness levels of said luminance signal to said selected threshold; for each said input brightness level greater than said threshold in said comparing step, assigning to said higher brightness level signal a brightness level equal to a difference between said greater input brightness level and said threshold and assigning to said lower brightness level signal a brightness level equal to said threshold; and, for each said input brightness level less than said threshold in said comparing step, assigning to said higher brightness level signal a brightness level equal to zero and assigning to said lower brightness level signal a brightness level equal to said input brightness level.

4. The method of claim 3, comprising the steps of: assigning to said higher brightness level signal a brightness level equal to zero if said input brightness level is equal to said threshold; and, assigning to said lower brightness level signal a brightness level equal to said input brightness level if said input brightness level is equal to said threshold.

5. The method of claim 1, comprising the step of delaying said higher brightness level signal to compensate for a delay incurred in said slew rate limiting.

6. The method of claim 1, comprising the steps of: applying said sparkle reducing steps to a luminance signal for said picture; delaying chrominance signals for said picture; and, generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

7. The method of claim 6, comprising the steps of: applying said sparkle reducing steps to at least one of said video drive signals; and, delaying all non-sparkle-reduced video drive signals.

8. The method of claim 1, comprising the steps of: generating a plurality of video drive signals from luminance and chrominance signals; applying said sparkle reducing steps to at least one of said video drive signals; and, delaying all non-sparkle-reduced video drive signals.

9. The method of claim 8, comprising the step of applying said sparkle reducing steps to each of said video drive signals.

10. The method of claim 7 comprising the step of independently selecting slew rate limits for said slew rate limiting steps.

11. A circuit for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: means for decomposing a video signal for a picture into a higher brightness level signal and a lower brightness level signal; means for slew rate limiting said lower brightness level signal; means for delaying said higher brightness level signal to match a processing delay incurred by said slew rate limiting; and, means for combining said slew rate limited lower brightness level signal and said delay matched higher brightness level signal to generate a modified video signal less likely to result in sparkle artifacts in said imager.

12. The circuit of claim 11, wherein said decomposing means includes: a register for storing a selected threshold value; a comparator for comparing successive input brightness levels of said luminance signal to said selected threshold value; an algebraic circuit for subtracting said threshold value from every one of said input brightness levels greater than said threshold; a clipping circuit for limiting to said threshold value every one of said input brightness levels greater than said threshold value a first gate for propagating a zero value brightness level for every one of said input brightness levels less than said threshold value; a second gate for propagating said input brightness level for every one of said input brightness levels less than said threshold; and, said higher brightness signal is formed by outputs from said algebraic circuit and said first gate and said lower brightness level signal is formed by outputs from said clipping circuit and said second gate.

13. The circuit of claim 12, wherein: said higher brightness level signal is formed by said output of said first gate when said input brightness level is equal to said threshold value; and, said lower brightness level signal is formed by said output of said second gate when said input brightness level is equal to said threshold value.

14. The circuit of claim 11, wherein said threshold value relates to a transition between lower and higher gain portions of a gamma table associated with said imager.

15. The circuit of claim 11, wherein said higher brightness level signal is delayed to match a delay incurred by operation of said slew rate limiting means.

16. The circuit of claim 11, wherein said video signal is a luminance signal, and further comprising: means for delaying chrominance signals for said picture; and, means for generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

17. The circuit of claim 16, comprising: means for decomposing at least one of said video drive signals into a higher brightness level video drive signal and a lower brightness level video drive signal; means for slew rate limiting said lower brightness level video drive signal; means for delaying said higher brightness level video drive signal to match a processing delay incurred by said slew rate limiting; and, means for combining said slew rate limited lower brightness level video drive signal and said delay matched higher brightness level

video drive signal to generate a modified video drive signal resulting in a further reduction of declination in said imager.

18. The circuit of claim 17, wherein said brightness level thresholds for said luminance signal decomposing means and said video drive signal decomposing means are independently selectable.

19. The circuit of claim 17, wherein slew rate limits for said slew rate limiting means are independently selectable.

20. The circuit of claim 17, comprising: respective means for decomposing, slew rate limiting, delaying and combining each one of said video drive signals; and, each of said luminance signal decomposing means and said video drive signal dividing means having independently selectable brightness level thresholds and each of said slew rate limiting means having independently selectable slew rate limits.

21. A circuit for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: a decomposer for dividing a video signal for a picture into a higher brightness level signal and a lower brightness level signal; a slew rate limiter for processing said lower brightness level signal, said slew rate limited lower brightness level signal being delayed; a delay circuit for said higher brightness level signal matched to said processing delay in said slew rate limiter; and, an algebraic circuit for combining said slew rate limited lower brightness level signal and said delay matched higher brightness level signal, and generating a modified video signal less likely to result in sparkle artifacts in said LCOS imager.

22. The circuit of claim 21, wherein said decomposer circuit has a selectable threshold value.

23. The circuit of claim 22, wherein said threshold value is related to a transition between lower and higher gain portions of a gamma table associated with said imager.

24. The circuit of claim 22, wherein said higher brightness level signal is delayed to match a delay incurred by said slew rate limiter.

25. The circuit of claim 21, wherein said video signal is a luminance signal, and further comprising: delay circuits for delay matching chrominance signals for said picture with said modified luminance signal; and, a color space converter for generating a plurality of video drive signals from said modified luminance signal and said delay matched chrominance signals.

26. The circuit of claim 25, further comprising: a further decomposer for decomposing at least one of said video drive signals into a higher brightness level video drive signal and a lower brightness level video drive signal; a further slew rate limiter for said lower brightness level video drive signal; a further delay circuit for delaying said higher brightness level video drive signal to match a processing delay incurred by said slew rate limiter; and, a further algebraic circuit for combining said slew rate limited lower brightness level video drive signal and said delay matched higher brightness level video drive signal to generate a modified video drive signal, resulting in a further reduction of declination in said imager.

27. The circuit of claim 26, wherein said decomposer and said further decomposer have independently selectable brightness level thresholds.

28. The circuit of claim 26, wherein said slew rate limiter and said further slew rate limiter have independently selectable slew rate limits.

29. The circuit of claim 26, comprising: respective decomposers, slew rate limiters, delay circuits and algebraic circuits for processing each one of said video drive signals; and, each of said decomposers having independently selectable brightness level thresholds.

APPENDIX II - COPY OF APPELLANTS BRIEF ON APPEAL OF REJECTION OF CLAIMS 1-25 IN APPLICATION 09/803,248

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applicant	:	Donald Henry Willis
Serial No.	:	09/803,249
Filed	:	March 9, 2001
For	:	REDUCING SPARKLE ARTIFACTS WITH LOW BRIGHTNESS PROCESSING
Examiner	:	Anyaso, Uchendu O
Art Unit	:	2675

APPEAL BRIEF

May It Please The Honorable Board:

This is Appellants' Brief on Appeal from the final rejection of claims 1 – 25. Please charge the $$330.00 fee for filing this Brief to Deposit Account No. 07-0832.

Please charge any additional fee or credit overpayment to the above-indicated Deposit Account. Enclosed are three copies of the Brief.

I. REAL PARTY IN INTEREST

The real party in interest of Application Serial No. 09/803,249 is :

THOMSON Multimedia Licensing Inc.

II. *RELATED APPEALS AND INTERFERENCES*

Applicant has filed one notice of appeal on a pending application (Application Serial No. 09/803,248) related in subject matter to the present application. Applicant intends to file an Appellants' Brief on Appeal from the final rejection of claims 1,2, 5-12, and 14-29 for Application Serial No 09/803,248 before the expiration of the time allotted for said filing.

III. *STATUS OF THE CLAIMS*

Claims 1-25 are rejected and the rejection of claims 1-25 are appealed.

IV. *STATUS OF AMENDMENTS*

All amendments were entered and are reflected in the claims included in Appendix I.

V. *SUMMARY OF CLAIMED SUBJECT MATTER*

Claim 1 is directed to a method for reducing sparkle artifacts (defined in applicants published specification **20020126080** in paragraph 11) due to non linearity in a transfer function of a liquid crystal imager (See, for example, paragraph 11 of published application). The method comprises the steps of low pass filtering (as for example by low pass filter 22 illustrated in Fig. 1 and in more detail in Fig. 3 at 22) only a first lower brightness level signal component (as for example denoted in Figs. 1 and 2 by "LOW1" and described in applicants published specification in paragraph 36) of a video signal (as described in applicant's specification, for example, in paragraph 32 and denoted by X in applicants drawing figures 1 and 2). Only a second lower brightness level signal component (for example LOW 2 illustrated in Fig. 1) of the video signal having the low pass filtered signal component (illustrated in Fig 1 denoted by X') is slew rate limited (See applicant's published application paragraph 39). The video signal having the low pass filtered and the slew rate limited signal components is less likely to result in sparkle artifacts in the imager. (paragraph 22, applicant's published specification)

Claim 2 is directed to the method recited in claim 1 and comprises the steps of decomposing (for example by first decomposer 12 in Fig. 1) the video signal (illustrated in Fig. 1 at X) into the first lower brightness level signal component (LOW 1 of Fig. 1) and a higher brightness level signal (denoted HIGH1 in Fig. 1) component prior to the low pass filtering (as for example by low pass filter 22 of Fig. 1). The low pass filtered first lower brightness level signal component (designated by LOWf in Fig. 1) and the higher brightness level signal component are combined (for example by adder 26 of Fig. 1) prior to the slew rate limiting.

Claim 3 is directed to the method recited in claim 2, and comprises the step of delay matching the higher brightness level signal component (as by delay match circuit 24 having signal HIGH1 as an input and signal HIGH1d as an output) with the low pass filtered lower first brightness level signal component (indicated as LOWf) prior to the combining step.

Claim 4 is directed to the method recited in claim 1 and comprises the steps of decomposing (as by second decomposer 30 of Fig. 1) the video signal (indicated, for example by X' in Fig. 1) having the low pass filtered first lower brightness level signal component. The video signal is decomposed into the second lower brightness level signal component (LOW2 of Fig. 1) and a higher brightness level signal component prior to the slew rate limiting. The slew rate limited second lower brightness level signal component and the higher brightness level signal component are combined (for example in second combiner 40 of Fig. 1) to generate the video signal (for example indicated by X'' in Fig. 2) having the low pass filtered and the slew rate limited signal component

Claim 5 is directed to the method of claim 4, and comprises the step of delay matching (as for example by second delay match 38 of Fig. 1) the higher brightness level signal component (indicated, for example, by HIGH2 in Fig. 2) with the slew rate limited lower brightness level signal component prior to the combining step.

Claim 6 is directed to the method of claim 1, and comprises the steps of decomposing (for example, by decomposer 12 of Fig. 1) the video signal into the first lower brightness level signal component and the first higher brightness level signal component prior to the low pass filtering. The low pass filtered first lower brightness level signal component (LOWf of Fig. 1) and the first higher brightness level signal component (HIGH1d in Fig. 1) are combined prior to the slew rate limiting. The video signal having the low pass filtered first lower brightness level signal component is divided into the second lower brightness level signal component and a second higher brightness level signal component prior to the slew

rate limiting. The slew rate limited second lower brightness level signal component (LOWs in Fig. 1) and the second higher brightness level signal component (HIGH 2d) are combined (for example, by combiner 40 of Fig. 1) to generate the video signal (For example, X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components.

Claim 7 is directed to the method of claim 6, comprising the step of supplying the video signal (for example, X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components to a liquid crystal on silicon imager.

Claim 8 is directed to the method of claim 1, and comprises the steps of applying the sparkle reducing steps to a luminance signal for the picture, delaying chrominance signals for the picture, and generating a plurality of video drive signals from the modified luminance signal and the delayed chrominance signals.

Claim 9 is directed to the method of claim 8, comprising the steps of applying the sparkle reducing steps to at least one of the video drive signals and delaying all non-sparkle-reduced video drive signals.

Claim 10 is directed to the method of claim 1, comprising the steps of generating a plurality of video drive signals from luminance and chrominance signals, applying the sparkle reducing steps to at least one of the video drive signals; and delaying all non-sparkle-reduced video drive signals.

Claim 11 is directed to the method of claim 1, comprising the steps of selecting different brightness thresholds for the first and second lower brightness level signal components in accordance with transitions between lower and higher level gain portions of a gamma table associated with the LCOS imager; and selecting slew rate limits in accordance with the gain of the gamma table(See, for example, applicant's published specification paragraph 4).

Claim 12 is directed to an apparatus (as for example illustrated in Fig. 1 at 10) for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising means for low pass filtering (indicated, for example, in Fig. 1 at 22) in only a first lower brightness level signal component (designated in Fig 1 by LOW1)of a video signal (at X in Fig. 1); and means for slew rate limiting (for example as indicated at 36 of Fig. 1) only a second lower brightness level signal component (for example indicated by LOW 2) of the video signal having the low pass filtered signal component (represented, for example, by X'in Fig. 1). The video signal having the low pass filtered and the slew rate limited signal

components (for example as represented by X'' in Figs 1 and 2)is less likely to result in sparkle artifacts in the imager.

Claim 13 is directed to the apparatus of claim 12, comprising means for decomposing (decomposer 12 of Fig.1) the video signal into the first lower brightness level signal component and a first higher brightness level signal component prior to the low pass filtering; means for combining (for example, combiner 26 in Fig.1) the low pass filtered first lower brightness level signal component and the first higher brightness level signal component prior to the slew rate limiting, means for dividing (unit 226 of Fig. 3)the video signal having the low pass filtered first lower brightness level signal component into the second lower brightness level signal component and a second higher brightness level signal component prior to the slew rate limiting; and, means for combining the slew rate limited second lower brightness level signal component and the second higher brightness level signal component to generate the video signal having the low pass filtered and the slew rate limited signal components.

Claim 14 is directed to the apparatus of claim 13, comprising means for delay matching (for example, first delay match 24 of Fig. 1) the first higher brightness level signal component(HIGH1 of Fig. 1) with the low pass filtered first lower brightness level signal component (LOWf) prior to the first-recited combining step; and means for delay matching (second delay match 38 of Fig. 1) the second higher brightness level signal component with the slew rate limited second lower brightness level signal component prior to the second-recited combining step.

Claim 15 is directed to the apparatus of claim 12, comprising means for delaying chrominance signals for the picture; and, means for generating a plurality of video drive signals from a luminance signal having the low pass filtered and the slew rate limited signal components and the delayed chrominance signals.

Claim 16 is directed to the apparatus of claim 12, wherein: different brightness thresholds for the first and second lower brightness level signal components are selectable in accordance with transitions between lower and higher level gain portions of a gamma table associated with the imager; and, slew rate limits are selectable in accordance with the gain of the gamma table (See, for example, applicant's published specification paragraph 4).

Claim 17 is directed to the apparatus of claim 12, wherein the means for low pass filtering has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 18 is directed to the apparatus of claim 12, wherein the imager is a liquid crystal on silicon imager.

Claim 19 is directed to an apparatus (as for example illustrated in Fig. 1 at 10)for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: a low pass filter for processing only a first lower brightness level signal component of a video signal (as for example denoted in Figs. 1 and 2 by "LOW1" and described in applicants published specification in paragraph 36); and, a slew rate limiter (for example as indicated at 36 of Fig. 1) for processing only a second lower brightness level signal component (LOW2 of Fig. 1) of the video signal having the low pass filtered signal component, the video signal having the low pass filtered and the slew rate limited signal components (X'' of Figs 1 and 3) being less likely to result in sparkle artifacts in the imager.

Claim 20 is directed to the apparatus of claim 19, comprising: a first decomposer (indicated at 12 of Figs 1 and 2) for dividing the video signal (X of Figs 1 and 2) into the first lower brightness level signal component and a first higher brightness level signal component prior to the low pass filter processing; a first algebraic unit (indicated at 26 of Fig. 1) for combining the low pass filtered first lower brightness level signal component and the first higher brightness level signal component prior to the slew rate limit processing; a second decomposer (indicated at 30 of Fig. 1) for dividing the video signal (represented by X'in Fig.1) having the low pass filtered first lower brightness level signal component into the second lower brightness level signal component (LOW2 of Fig. 1) and a second higher brightness level signal component (HIGH2 of Fig. 1) after the combining and prior to the slew rate limit processing; and, a second algebraic unit (indicated at 40 of Fig. 1) for combining the slew rate limited second lower brightness level signal component and the second higher brightness level signal component to generate the video signal (X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components.

Claim 21 is directed to the apparatus of claim 20, comprising: a first delay match circuit (indicated, for example, at 24 of Fig. 1) for delaying the first higher brightness level signal component (for example HIGH1 of Fig. 1) prior to the combining with the low pass filtered first lower brightness level signal component; and, a second delay match circuit (for example indicated at 38 of Fig. 1) for delaying the second higher brightness level signal component (HIGH2 of Fig. 1) prior to the combining with the slew rate limited second lower brightness level signal component.

Claim 22 is directed to the apparatus of claim 21, and comprises a delay matching circuit (for example indicated at 24 of Fig. 1) for delaying chrominance signals for the picture and a color space converter for generating a plurality of video drive signals from a luminance signal having the low pass filtered and the slew rate limited signal components and the delayed chrominance signals.

Claim 23 is directed to the apparatus of claim 19, wherein different brightness thresholds for the first and second lower brightness level signal components (LOW1 and LOW2 of Fig. 1) are selectable in accordance with transitions between lower and higher level gain portions of a gamma table associated with the imager. (See, for example, applicant's published specification paragraph 4)The slew rate limits are selectable in accordance the gain of the gamma table.

Claim 24 is directed to the apparatus of claim 21, wherein the low pass filter has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 25 is directed to the apparatus of claim 21, wherein the imager is a liquid crystal on silicon imager.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

3. Regarding independent claims 1, 12 and 19 applicant appeals the action of the office rejecting claims 1, 12 and 19 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) with respect to the specific grounds cited by the examiner that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)"

4. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)".

5. Regarding claims 1-25 applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Okada teaches a split low pass filter (10, 11) arrangement and a delay matching circuit (15, 16, 18) wherein the low-pass filters (10, 11) are for independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel interdependence, and the delay matching circuit for the high brightness signal (figures 1, 2 at 10, 11, 15, 16, 18, column 7, lines 5-16, figure 3 at S7; column 3, lines 4-13;)"

6. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see* also column 4, lines 23-27)"

7. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine Okada and Mihara to arrive at the invention claimed in applicant's claims 1-25 and therefore has not made out a prima facie case of obviousness.

8. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine the disclosures of Okada, Mihara and Carlson to arrive at applicant's claimed invention and therefore has not made out a prima facie case of obviousness.

9. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action reproduced verbatim as follows: "However, Okada and Mihara do not teach a means for providing the brightness signals and the slew rate limited signal to provide an output that reduces sparkle artifacts. On the other hand, Carlson teaches this concept by teaching how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) such that sparkle is suppressed (column 13, lines 46-50)".

10. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Carlson teaches a method of reducing sparkle artifacts due to non linearity in a transfer function by teaching an image processing system using narrow-band coring such that filtering after coring suppresses sparkle (column 13, lines 46-50)"

11. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action "it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara and Carlson because while the combination of Okada and Mihara teaches the concept of dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal and then slew rate limiting one of the signals (column 2, lines 17-33), Carlson teaches the method sparkle suppression (column 13, lines 46-50; column 18," lines 29-49,figure 2a; see also column 8, lines 24-62, figure 2a). The motivation for combining these inventions would have been to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Abstract)".

12. Regarding claims 8 and 9, in further discussion of claim 1, applicant appeals the rejection of claims 8 and 9 as unpatentable under 35 U.S.C. 103(a) over Okada et

al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230), inter alia, on the specific grounds cited by the office action that "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara, Carlson and Jang because while the combination of Okada, Mihara and Carlson how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27) and a method of reducing sparkle artifacts, Jang teaches a video signal processing circuit of a CCD-type color video camera that includes a gamma correction circuit, delay circuit, a chrominance signal processor and luminance signal processor (see Abstract; column 3, lines 26-45, figure 3 at 20).. The motivation for combining these inventions would have been to improve the picture quality of a video device (column 2, lines 28-32).

VII. ARGUMENT

3. Regarding independent claims 1, 12 and 19 applicant appeals the action of the office rejecting claims 1, 12 and 19 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) with respect to the specific grounds cited by the examiner that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)". The rejection is in error because the alleged teaching of Okada does not correspond to any feature recited in applicant's claims 1, 12 and 19, therefore the rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of claims 1, 12 and 19.

4. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)" for the following reasons.

a. First, the examiner errs in relying on Okada's disclosure of "means for dividing light" as teaching or suggesting applicant's features relating to decomposing video signals because the reference describes a light dividing means, and then only in the context of an optical subsystem. Optics is a non analogous art. The dividing means of the Okada reference is described by Okada (abstract) as follows: "A beam splitter divides light reflected by the surface of the object into two parts. Each of the divided parts of the light is passed through an optical filter whose transmission wavelength range is set according to the colors of the object, to adjust the quantity of transmitted light from a high-brightness part of the object surface and the quantity of transmitted light from a low-brightness part of the object surface to a reference level."

b. The principles of engineering and physics applicable to dividing visible light into light beams using beamsplitters, (the science of optics) are not applicable to the task of decomposing a video signal into video signal components. Okada lacks any teaching that the term "light" should be given any meaning other than its ordinarily understood meaning, that is "radiant energy that is capable of exciting the retina" (The New IEEE Standard Dictionary of Electrical and Electronics Terms, The Institute of Electrical and Electronics Engineers, Inc., 1993, page 714.) The term "video signal" as commonly understood and as described in applicants specification, for example, in paragraph 32: "The video signal is a digital signal, and the waveform is a succession of digital samples representing brightness levels." One of ordinary skill in the art would not be motivated to provide a video signal to an optical dividing means such as a beamsplitter so as to decompose the video signal into high and low brightness level video signal components prior to low pass filtering. One of ordinary skill in the art would not expect success in such a combination. Therefore, there is no motivation to combine a teaching of an optical subsystem designed to divide visible light into light beams with any other reference to arrive at applicant's claimed invention.

c. Finally, even considering, arguendo, the teaching of Okada regarding dividing means to be analogous art, the examiner errs on this ground of rejection because no reference contains a teaching, suggestion or incentive

which would have led one of ordinary skill in the art to modify or combine the optical light dividing subsystem of Okada with the teaching of Mihara or Carlson to arrive at applicant's claimed invention. It would be technically impossible and non feasible to modify such an optical sub-system so that it could decompose a video signal into components in a way that would meet the requirements of applicant's claims. This fact, in and of itself, is a disincentive to the artisan to do so. In addition, the purpose for which the Okada optical subsystem is intended (dividing light reflected from the surface of an object to be inspected) is not normally present in the environment in which applicant's apparatus is operated. Therefore, the artisan would not have been motivated by Okada, Mihara Carlson, or any other reference, taken alone or in combination, to combine the light dividing features described in Okada with any another reference in such a manner as to meet the terms of applicant's claims reciting decomposing video signals.

d. Second, the examiner errs in this ground of rejection by relying on impermissible hindsight and applicant's own disclosure in interpreting the reference as disclosing or suggesting "means for dividing a signal", when in fact the reference describes only "means for dividing light." Further, in this context, the reference describes "brightness"solely as it relates to a high or low brightness part of the object surface. The examiner's conclusion that such a description of dividing light reflected from a high or low brightness part of an object surface teaches or suggests a decomposer for decomposing a video signal into high or low brightness level video signal components is so overreaching it could only have been postulated using impermissible hindsight gleaned from reading applicant's specification describing "decomposing video signals" and "brightness level video signal components".

e. Accordingly, no portion of the cited reference includes a teaching of "dividing means" sufficient to provide a basis for an obviousness rejection of any of applicant's claims 1-25.

5. Regarding claims 1-25 applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Okada teaches a split low pass filter (10, 11) arrangement

and a delay matching circuit (15, 16, 18) wherein the low-pass filters (10, 11) are for independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel interdependence, and the delay matching circuit for the high brightness signal (figures 1, 2 at 10, 11, 15, 16, 18, column 7, lines 5-16, figure 3 at S7; column 3, lines 4-13;)". The examiner errs in making this specific grounds for rejection for the following reasons.

a. First, contrary to the examiner's assertion, Okada does not teach that the low pass filters (10, 11) are for "independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel interdependence" as alleged by the examiner. Such an interpretation contradicts the actual disclosure of Okada. Okada specifically describes the cited low pass filters illustrated at 10 and 11 are for **filtering noise** from amplified image signals A2 and B2. (See Okada col 4 lines 52 -59 " In step S3, the low-pass filters 10 and 11 remove noise components from the amplified image signals A2 and B2 and provide image signals A3 and B3, respectively. ")

b. Second, applicant's claims lack any corresponding filter having the purpose conjectured by the examiner. Applicant's claims recite a low pass filter that operates only on a low brightness level signal component of a video signal. Okada, on the other hand, describes that both filters 10, 11 are applied to both of the amplified image signals A2 and B2. According to Okada (see, for example, Figure 1) the amplified image signals A2 and B2 taken together comprise the entire image signal to be processed. Thus, there is no disclosure in Okada of using low pass filters 10 and 11 to filter "only a lower brightness level signal component of a video signal." Okada describes the light reflected from the object should be equalized before forming an image signal. See for example, Okada col. 2 lines 30-37. Okada states, **"In this way, the quantities of the transmitted light** from the high- and low-brightness parts of the object surface are equalized, **and the image pick-up means simultaneously pick up the images** of the high- and low-brightness parts of the object at the same positional relations and **photoelectrically convert the images into electric image signals**." Okada further states amplifiers 8 and 9 are adjusted to have equal output signal levels. " In step S2, the object kind presetting unit PS

controls amplification factors of the amplifiers 8 and 9 so that output signal levels of the amplifiers 8 and 9 will be equal to each other once the quantity of light from the white part of the capsule transmitted through the optical filter 4 and the quantity of light from the red part of the capsule transmitted through the optical filter 5 are adjusted to the reference level. Thus, Okada describes that image signals A1 and B1 are equal with respect to the high and low brightness parts of the object.

6. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals (*see* Abstract; *see* also column 4, lines 23-27)" because Mihara lacks any teaching or suggestion to slew rate limit signals.

   a. The cited column 4 lines 23 - 27 recites: "By the method as described in the above example the part *[of the waveform of the measured analog signal]*, where the slew rate of the waveform [*of the measured analog signal*] is high, is displayed darkly [*on the waveform displaying device*] and the part, where the slew rate is low, is displayed brightly *[on the waveform displaying device]*." Therefore, Mihara describes displaying a waveform differently [displaying darkly, or displaying lightly], based on slew rate of the signal to be represented by the waveform. There is no teaching in Mihara to slew rate limit a signal or a waveform.

   b. The cited abstract of Mihara describes, "A waveform displaying device, in which a measured analogue signal is converted into a digital signal by means of an analogue to digital converter and thereafter the digital signal is directly inputted in a display device (19) such as a raster scanning display, a liquid crystal display device, effecting the display while controlling the brightness of pixels **so as to reproduce to display waveform of the measured analogue signal.** In the present device the brightness of pixels is varied, **depending on slew rate** of the waveform, so that the **brightness of interpolation lines is increased**, when differences between inputted waveform data are small, and the brightness is decreased, when the differences are small."

c. A teaching to increase the brightness of interpolation lines in portions of a waveform where the represented signal has a high slew rate is not a teaching of slew rate limiting any signal or waveform. Therefore, it can be readily appreciated by a close reading of the above cited portions of the Mihara specification that no teaching of slew rate limiting a signal, or of a slew rate limiter, is provided by Mihara.

7. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine Okada and Mihara to arrive at the invention claimed in applicant's claims 1-25 and therefore the examiner has not made out a prima facie case of obviousness.

   a. In rejecting applicant's claims, the examiner states what he believes (albeit erroneously) the references teach, "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada and Mihara because while Okada teaches a means for dividing an input signal into a high-brightness and low-brightness part and low-pass filters (10, 11) for independently low pass filtering rising transients and falling transients in said low brightness signal, Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27).

   b. The examiner then provides no more than a conclusory statement regarding general motivations in the art to provide excellent waveform display devices, "The motivation for combining these inventions would have been to provide an excellent waveform display device capable of efficiently displaying large quantity of data (column 2, lines 20-25)." First, such a motivation would not be likely to result in any combination of references that meet applicant claim limitations, therefore there could not be expectation of success. Further, such conclusory statements of vague and general motivation fails to provide the requisite factual findings as to how the alleged teachings of Okada and Mihara could be applied to meet the specific requirements of applicants claims. "[C]onclusory statements' as to teaching, suggestion or motivation to arrive at

the claimed invention "do not adequately address the issue of obviousness." In re Lee, 277 F.3d 1338, 1343-44, 61 USPQ2d 1430, 1433 (Fed Cir. 2002).

8. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine the disclosures of Okada, Mihara and Carlson to arrive at applicant's claimed invention and therefore has not made out a prima facie case of obviousness.
9. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action reproduced verbatim as follows: "However, Okada and Mihara do not teach a means for providing the brightness signals and the slew rate limited signal to provide an output that reduces sparkle artifacts. On the other hand, Carlson teaches this concept by teaching how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) such that sparkle is suppressed (column 13, lines 46-50)" for the following reasons.
    a. First, the phrase "this concept" in the examiner's assertion lacks a clear antecedent basis and applicant is unable to determine what concept the examiner believes is taught by the Carlson reference that provides the requisite motivation to combine the teachings of Okada and Mihara, and further Carlson. As a result the examiner's statement fails to provide any basis for rejection sufficiently clear to afford the applicant a fair opportunity to make a coherent response.
    b. Second, a stated teaching, "... how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) is a teaching so far removed from applicant's claimed invention that neither

applicant, nor one of ordinary skill in the art, would be able to determine any relationship at all between the alleged teaching and applicant's claims.

c. Therefore the rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of applicant's claims.

d. Further, the examiner's assertion that the forgoing filters described in the Carlson reference are arranged "such that sparkle is suppressed" (column 13, lines 46-50)" is not a teaching found anywhere in the cited reference. In stating that the filters are arranged to the said effect, the examiner impermissibly borrows words, concepts and phrases from applicants specification and uses these to interpret the teaching of the reference. Such a practice constitutes the use of impermissible hindsight. Fourth, the examiners interpretation of the teaching using said borrowed words taken from applicant's specification fails to define any technically comprehensible feature since there is no teaching that such a filter arrangement is related to the phenomena of sparkle artifacts due to non linearity in liquid crystal imagers.

10. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Carlson teaches a method of reducing sparkle artifacts due to non linearity in a transfer function by teaching an image processing system using narrow-band coring such that filtering after coring suppresses sparkle (column 13, lines 46-50)" for the following reasons. First, the Carlson reference contains no teaching or suggestion that filtering after coring suppresses sparkle. Second, the examiner uses impermissible hindsight to interpret the reference to arrive at applicants claimed invention. Third, the examiner employs words phrases and concepts found solely in applicants specification in such a way as to arrive at a statement of the teaching of Carlson in direct contradiction to Carlson's explicit teachings. Accordingly, applicant requests appellate review of this specific grounds for rejection.

11. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action "it would have been obvious to a person of ordinary skill in

the art to combine Okada, Mihara and Carlson because while the combination of Okada and Mihara teaches the concept of dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal and then slew rate limiting one of the signals (column 2, lines 17-33), Carlson teaches the method sparkle suppression (column 13, lines 46-50; column 18," lines 29-49,figure 2a; see also column 8, lines 24-62, figure 2a). The motivation for combining these inventions would have been to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Abstract)" for the following reasons. First the recited grounds for rejection provide no more than a recitation of what the examiner (incorrectly) believes each reference teaches and as such it fails to provide any reason why one of ordinary skill in the art would modify or combine the cited references to meet the features of applicant's claims. The motivation cited by the examiner "to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Carlson Abstract)" is taken from the Carlson reference describing Carlson's own invention. It does not amount to a suggestion to modify or combine an optical light dividing subsystem (Okada) with an oscilloscope displaying a signal waveform (Mihara) to arrive at applicants claimed features for processing video signals so as to reduce sparkle artifacts in a liquid crystal imager. The skilled artisan would have no reasonable expectation of success in making such a combination because applicant's claimed invention could not be technically accomplished by any modification or combination of the references. The rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of applicant's claims. Therefore, the examiner has failed to make out a prima facie case for obviousness.

12. Regarding claims 8 and 9, applicant appeals the rejection of claims 8 and 9 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230), inter alia, on the specific grounds cited by the office action that "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara, Carlson and Jang because while the combination of Okada, Mihara and Carlson how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27) and a method of reducing sparkle artifacts, Jang teaches a video signal processing circuit of a CCD-type color video camera that includes a gamma

correction circuit, delay circuit, a chrominance signal processor and luminance signal processor (see Abstract; column 3, lines 26-45, figure 3 at 20).. The motivation for combining these inventions would have been to improve the picture quality of a video device (column 2, lines 28-32). Applicant appeals this grounds for rejection for the following reasons. First, for all the reasons cited above with regard to the teachings of Okada, Mihara and Carlson. Second, the combination of Okada, Mihara and Carlson do not teach "how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27)" as alleged by the examiner. Third, the examiner's statements amount to no more than a summary of what the examiner believes (albeit erroneously) each of the cited references separately teach. The mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). A general statement that a motivation exists in the art "to improve the picture quality of video devices" fails to provide an adequate reason why one of ordinary skill in the art would be motivated to combine the teachings of the cited references to arrive at applicant's claimed invention. "[C]onclusory statements' as to teaching, suggestion or motivation to arrive at the claimed invention "do not adequately address the issue of obviousness." In re Lee, 277 F.3d 1338, 1343-44, 61 USPQ2d 1430, 1433 (Fed Cir. 2002). Further, the teachings of the cited references are such that it would not be technically feasible or desirable to modify or combine these teachings to arrive at applicant's claimed invention.

Respectfully submitted,
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APPENDIX I - APPEALED CLAIMS

Claim 1. A method for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising the steps of:

low pass filtering only a first lower brightness level signal component of a video signal; and,

slew rate limiting only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 2. The method of claim 1, comprising the steps of:

decomposing said video signal into said first lower brightness level signal component and a higher brightness level signal component prior to said low pass filtering; and,

combining said low pass filtered first lower brightness level signal component and said higher brightness level signal component prior to said slew rate limiting.

Claim 3. The method of claim 2, comprising the step of delay matching said higher brightness level signal component with

said low pass filtered lower first brightness level signal component prior to said combining step.

Claim 4. The method of claim 1, comprising the steps of:

decomposing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a higher brightness level signal component prior to said slew rate limiting; and,

combining said slew rate limited second lower brightness level signal component and said higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal component.

Claim 5. The method of claim 4, comprising the step of delay matching said higher brightness level signal component with said slew rate limited lower brightness level signal component prior to said combining step.

Claim 6. The method of claim 1, comprising the steps of:

decomposing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filtering;

combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limiting;

dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component prior to said slew rate limiting; and,

combining said slew rate limited second lower brightness level signal component and said second higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 7. The method of claim 6, comprising the step of supplying said video signal having said low pass filtered and said slew rate limited signal components to a liquid crystal on silicon imager.

Claim 8. The method of claim 1, comprising the steps of:

applying said sparkle reducing steps to a luminance signal for said picture;

delaying chrominance signals for said picture; and,

generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

Claim 9. The method of claim 8, comprising the steps of:

applying said sparkle reducing steps to at least one of said video drive signals; and,

delaying all non-sparkle-reduced video drive signals.

Claim 10. The method of claim 1, comprising the steps of:

generating a plurality of video drive signals from luminance and chrominance signals;

applying said sparkle reducing steps to at least one of said video drive signals; and,

delaying all non-sparkle-reduced video drive signals.

Claim 11. The method of claim 1, comprising the steps of:

selecting different brightness thresholds for said first and second lower brightness level signal components in accordance with transitions between lower and higher level gain portions of a gamma table associated with said LCOS imager; and,

selecting slew rate limits in accordance with the gain of said gamma table.

Claim 12. An apparatus for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising:

means for low pass filtering only a first lower brightness level signal component of a video signal; and,

means for slew rate limiting only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 13. The apparatus of claim 12, comprising:

means for decomposing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filtering;

means for combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limiting;

means for dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component prior to said slew rate limiting; and,

means for combining said slew rate limited second lower brightness level signal component and said second higher

brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 14. The apparatus of claim 13, comprising:

means for delay matching said first higher brightness level signal component with said low pass filtered first lower brightness level signal component prior to said first-recited combining step; and,

means for delay matching said second higher brightness level signal component with said slew rate limited second lower brightness level signal component prior to said second-recited combining step.

Claim 15. The apparatus of claim 12, comprising:

means for delaying chrominance signals for said picture; and,

means for generating a plurality of video drive signals from a luminance signal having said low pass filtered and said slew rate limited signal components and said delayed chrominance signals.

Claim 16. The apparatus of claim 12, wherein:

different brightness thresholds for said first and second lower brightness level signal components are selectable in

accordance with transitions between lower and higher level gain portions of a gamma table associated with said imager; and,

slew rate limits are selectable in accordance with the gain of said gamma table.

Claim 17. The apparatus of claim 12, wherein said means for low pass filtering has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 18. The apparatus of claim 12, wherein said imager is a liquid crystal on silicon imager.

Claim 19. An apparatus for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising:

a low pass filter for processing only a first lower brightness level signal component of a video signal; and,

a slew rate limiter for processing only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 20. The apparatus of claim 19, comprising:

a first decomposer for dividing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filter processing;

a first algebraic unit for combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limit processing;

a second decomposer for dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component after said combining and prior to said slew rate limit processing; and,

a second algebraic unit for combining said slew rate limited second lower brightness level signal component and said second higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 21. The apparatus of claim 20, comprising:

a first delay match circuit for delaying said first higher brightness level signal component prior to said

combining with said low pass filtered first lower brightness level signal component; and,

a second delay match circuit for delaying said second higher brightness level signal component prior to said combining with said slew rate limited second lower brightness level signal component.

Claim 22. The apparatus of claim 21, comprising:

a delay matching circuit for delaying chrominance signals for said picture; and,

a color space converter for generating a plurality of video drive signals from a luminance signal having said low pass filtered and said slew rate limited signal components and said delayed chrominance signals.

Claim 23. The apparatus of claim 19, wherein:

different brightness thresholds for said first and second lower brightness level signal components are selectable in accordance with transitions between lower and higher level gain portions of a gamma table associated with said imager; and,

slew rate limits are selectable in accordance the gain of said gamma table.

Claim 24. The apparatus of claim 21, wherein said low pass filter has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 25. The apparatus of claim 21, wherein said imager is a liquid crystal on silicon imager.